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THE ST. LAWRENCE SEAWAY  
AND  
THE PROBLEM OF FULL-COST  
RECOVERY



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AND  
THE PROBLEM OF FULL-COST  
RECOVERY

ONTARIO

ECONOMIC COUNCIL



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## (1) INTRODUCTION

The St. Lawrence Seaway Authority has recently issued the following notice:

"The 1959 Memorandum of Agreement between The St. Lawrence Seaway Authority and the Saint Lawrence Seaway Development Corporation of the United States respecting the St. Lawrence Seaway Tariff of Tolls provides that after five complete seasons of navigation have elapsed, and not later than July 1, 1964, a report shall be made to their respective Governments 'as to the sufficiency of the authorized tolls to meet the statutory requirements'.

A detailed analysis of the five seasons of navigation is required for the preparation of such a report, as well as an examination of various economic factors affecting the tolls structure, such as traffic growth, the competitive position of the different transportation modes and its impact on the various industries related to the Seaway.

For the purpose of assisting the Seaway entities in the course of the present review, all interested parties are invited to submit written statements dealing with the Tariff of tolls, including the various charges such as on gross registered tonnage, bulk cargo, general cargo, ballast and domestic package freight. The statements should be prepared in two copies and forwarded to the undersigned not later than Tuesday, September 3, 1963.

Following the review of these statements and the study of the five seasons of navigation, public hearings will be held for the submissions of formal briefs and oral presentations."

The preliminary report presented here is designed to associate the members of the Economic Council with the development of the St. Lawrence Seaway, especially the Montreal-Lake Ontario section, and with its traffic and revenue problems.

It is hoped that this report will assist the Council to decide whether or not it should submit a brief with recommendations to the St. Lawrence Seaway Authority or the Canadian Government.

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## (2) THE DEVELOPMENT OF THE ST. LAWRENCE SEAWAY

Canada and the United States first reached agreement and signed a treaty on an International Seaway between Montreal and Lake Ontario in 1932. This treaty the United States Senate failed to ratify.

Similarly, a new agreement which was signed in March 1941 also failed to obtain Congressional approval.

During the next decade Canada grew more determined to construct the Seaway, with or without the participation of the United States. At the same time, the need for additional electrical power in Eastern Canada and the United States was becoming increasingly apparent and in 1951 an agreement of a somewhat different kind was concluded.

On this occasion the agreement was a tripartite one, the signatories being the Canadian Government, the United States Government, and the Government of Ontario. The agreement stipulated that the Government of Canada would construct a St. Lawrence Seaway within Canadian territory and that the Ontario Government, together with an authority to be designated by the United States Government, would develop the power resources of the International Rapids Section of the St. Lawrence River.

This agreement received the approval of the Canadian Parliament and in December, 1951 legislation was enacted establishing the St. Lawrence Seaway Authority. At that time it did appear that Canada would in fact establish the Seaway alone, but in November, 1952 President Truman reminded Congress that the United States could still participate in the project if it desired.

In June 1953, the U.S. Federal Power Commission issued an order granting a 50-year licence to the Power Authority of the State of New York for the development, in conjunction with Ontario Hydro, of the United States half of the power project.



The legality of this order was challenged by opponents of the project, but upheld in June, 1954 by the U.S. Supreme Court.

Despite continued opposition from U.S. East Coast and Gulf Ports and from road and rail interests, the prospects of an all-Canadian Seaway finally constrained the United States Congress to pass in May 1954 the Wiley-Dondero Act, which authorized the St. Lawrence Seaway Development Corporation to construct on U.S. territory all the navigation facilities in the International Rapids Section of the proposed Seaway.

After further discussions with Canada, the United States agreed to construct a canal (the Long Sault Canal) and two locks opposite Barnhart Island in the International Rapids Section and to do the necessary dredging in the Thousand Island Section.

Canada for its part, agreed to build a ten-mile long canal along the south shore opposite Montreal; four locks between Montreal and Cornwall; and a one-mile canal with one lock at Iroquois. Canada further agreed to dredge the sixteen-mile Beauharnois Power Canal and to deepen the channel between the existing locks in the twenty-seven mile Welland Canal.

Work commenced on the Seaway in August 1954 and it was completed during the Spring of 1959. The official opening took place on June 26, 1959.

The final cost to date of the Seaway is \$480 million and this sum is divided between Canada and the United States in the following manner:

	\$
Canada: Montreal-Lake Ontario	314,047,395
Welland Canal	33,253,684
U.S.A.: Montreal - Lake Ontario	<u>132,400,000</u>
	479,701,079
	<u><u>                  </u></u>



### (3) THE DEVELOPMENT OF TOLLS ON THE ST. LAWRENCE SEAWAY

A policy of toll-free canals evolved during the first few years of this century. This development took place primarily to ensure the movement abroad of grain from the West via Canadian ports at the lowest possible price.

The Saskatchewan Government's submission to the Tolls Committee in 1958 stated the basic philosophy underlying the toll-free policy: "economic development....could proceed only as fast as provision was made for transportation facilities....and Canadian statesmen for more than a century have realized that because of the great distances and sparse population of the Dominion, the resources of the State would have to be thrown into the task of ensuring essential transportation improvements, either directly by way of unremunerative state enterprise or in subsidies to private enterprise".

This policy of toll-free canals continued from 1903 until April 24, 1947 when Louis St. Laurent, the then Minister of External Affairs, indicated a change in the traditional policy in his reply to a question from the United States Government on whether the Canadian Government would agree to tolls on a St. Lawrence Seaway. His answer was: "Canada will not object to the principle of tolls provided they could be arranged in such a way that there would be genuine benefit to transportation in a reduction of charges by the construction of a Seaway".

On February 16, 1951, the above principle was confirmed by the Canadian Ambassador in Washington in a note to the U.S. Secretary of State. This note stated that the policy of the Canadian Government remained as follows: "The Canadian Government has now concurred in principle with the proposal to make the St. Lawrence Seaway self-liquidating by means of toll charges, subject to the conclusion of arrangements satisfactory to both governments for implementation of this principle".



At this juncture, you may have observed, the principle of tolls is superseded by the principle of full-cost recovery.

On December 31, 1951 the St. Lawrence Seaway Authority was established to build, maintain and operate the Canadian sections of the St. Lawrence Seaway. In Section 15 of the Act it states that this Authority may establish tariffs and tolls; and, in Section 16, that these charges must be sufficient to defray the following costs:

- (a) payments in respect of the interest on amounts borrowed by the Authority to carry out such purposes;
- (b) amounts sufficient to amortize the principal amounts so borrowed over a period not exceeding fifty years; and
- (c) the cost of operating and maintaining the canals and works under the administration of the Authority, including all operating costs of the Authority and such reserves as may be approved by the Minister of Transport.

In the case of the United States, Congressional approval would never have been forthcoming if the legislation had not stipulated that tolls would be imposed. As a result, the Wiley-Bondero Act of May 13, 1954, setting up the St. Lawrence Seaway Development Corporation, the American counterpart of the St. Lawrence Seaway Authority, gives the Corporation explicit power to finance the United States share of the Seaway cost on a self-liquidating basis.

To investigate and report upon the scale of tolls needed to assure the amortization of the costs involved in constructing the St. Lawrence Seaway over a period of 50-years, toll committees were set up by both the United States and Canada in March 1955.



The report of the Canadian Committee, presented in June, 1958, recommended a schedule of tolls for the St. Lawrence Seaway and the Welland Canal. It received the support of the American Committee and in a Memorandum of Agreement between the St. Lawrence Seaway Authority and the St. Lawrence Development Corporation became effective from April 1st, 1959.

TOLL SCHEDULE

	<u>Montreal to or from Lake Ontario</u>	<u>Welland Canal</u>	<u>Complete Transit</u>
	\$	\$	\$
For transit of the Seaway, a composite toll, comprising -			
(1) a charge per gross registered ton, according to national registry of the vessel, applicable whether the vessel is wholly or partially laden, or is in ballast -	.04	.02	.06
(2) a charge per ton (2000lb) of cargo, as certified on ship's manifest or other documents, as follows:			
- bulk cargo	.40	.02	.42
- general cargo	.90	.05	.95
Bulk cargo includes domestic package freight.			
(3) a charge per passenger	3.50	4.00	7.50
(4) minimum charges, subject to the provisions of sub-items (1), (2) and (3): -			
- pleasure craft	14.00	16.00	30.00
- other vessels	28.00	32.00	60.00



The memorandum also stated that the division of tolls derived from the operation of the St. Lawrence Seaway between Montreal and Lake Ontario should be initially 71 per cent in Canadian dollars to the Authority and 29 per cent in U.S. dollars to the Corporation, such division being based upon preliminary estimates of their respective annual charges. Tolls derived from the Welland were to accrue to the Canadian Authority only.

It was also agreed that after five complete seasons of navigation, and not later than July 1, 1964, the Authority and the Corporation would report to their respective governments as to the sufficiency of the authorized tolls to meet the statutory requirements, and to cause the tolls to be reviewed accordingly.

The main developments since April 1, 1959 have been:

- (a) the volume of traffic through the St. Lawrence Seaway has been less than that expected by the tolls committees;
- (b) revenues have been less and costs higher than expected; and
- (c) tolls on the Welland Canal were suspended unilaterally by the Canadian Government on July 18, 1962.



#### (4) THE PROBLEM OF FULL-COST RECOVERY

##### (A) The Calculations of the Toll Committee

It is necessary first of all to become acquainted with the calculations of the Toll Committee. The main table from the Committee's Report is attached. From this the tolls levied on the Montreal - Lake Ontario portion of the Seaway were derived.

Several observations on this table are required: -

###### (i) Tons

The tons used in these calculations are short tons and are for cargo. It was estimated that about 10 to 12 per cent of this tonnage would be general cargo and the remainder bulk cargo.

The table shows that the annual-tonnage increases from 1959 to 1968 without interruption and then, at the capacity level of 50 million tons, remains constant until 2008. No allowance was made apparently for cyclical fluctuations in demand during say the first ten years of the Seaway's existence with the result that the forecasts are optimistic.

###### (ii) Revenue

The revenue figures are directly proportional to tonnage and imply constant toll charges per ton. Thus over the time period covered toll rates do not rise or fall with demand or the general level of prices.

If the toll charges remained constant after 1968, when full-capacity use is attained, it would become necessary to introduce some method other than price to ration the available facilities.

###### (iii) Operation and Maintenance Expenses

These are assumed, unrealistically, to remain constant for fifty years. As far as I can ascertain, these figures contain a sum for administrative expenses but nothing for depreciation.



## ST. LAWRENCE SEAWAY

TABLE A

## MONTREAL TO LAKE ONTARIO

## UNITED STATES AND CANADA COMBINED

## ESTIMATED REVENUE, EXPENSES AND AMORTIZATION

Year	Tons (Millions)	Revenue	Operation and Maintenance Expenses	Net Revenue (Available for Debt Service)	Accrued Interest		Payment on Principal and Deferred Interest	Debt Outstanding
					Currently	Paid Deferred		
1959	25 <u>1</u>	13,100,000	3,200,000	9,900,000	9,900,000	2,868,750	--	44,868,750
1960	29	15,196,000	4,272,000	10,924,000	10,924,000	6,212,126	--	451,080,876
1961	33	17,292,000	4,272,000	13,020,000	13,020,000	4,356,344	--	455,437,220
1962	37	19,388,000	4,272,000	15,116,000	15,116,000	2,429,079	--	457,866,299
1963	41	21,484,000	4,272,000	17,212,000	17,157,206	482,365	54,794	458,293,870
1964	44	23,056,000	4,272,000	18,784,000	17,656,948	--	1,127,052	457,166,818
1965	47	24,628,000	4,272,000	20,356,000	17,614,429	--	2,741,571	454,425,247
1966	48	25,152,000	4,272,000	20,880,000	17,509,698	--	3,370,302	451,054,945
1967	49	25,676,000	4,272,000	21,404,000	17,380,750	--	4,023,250	447,031,695
1968	50	26,200,000	4,272,000	21,928,000	17,226,650	--	4,701,350	442,330,345
1969	50	26,200,000	4,272,000	21,928,000	17,046,075	--	4,881,925	437,448,420
1970	50	26,200,000	4,272,000	21,928,000	16,858,538	--	5,069,462	432,378,958
1971	50	26,200,000	4,272,000	21,928,000	16,663,770	--	5,244,230	427,114,728
1972	50	26,200,000	4,272,000	21,928,000	16,461,492	--	5,466,508	421,648,220
1973	50	26,200,000	4,272,000	21,928,000	16,251,414	--	5,676,586	415,971,634
1974	50	26,200,000	4,272,000	21,928,000	16,033,232	--	5,894,768	410,076,866
1975	50	26,200,000	4,272,000	21,928,000	15,806,634	--	6,121,366	403,955,500
1976	50	26,200,000	4,272,000	21,928,000	15,571,294	--	6,356,706	397,598,794
1977	50	26,200,000	4,272,000	21,928,000	15,326,873	--	6,601,127	390,997,667
1978	50	26,200,000	4,272,000	21,928,000	15,073,020	--	6,854,980	384,142,687
1979	50	26,200,000	4,272,000	21,928,000	14,809,370	--	7,118,630	377,024,057
1980	50	26,200,000	4,272,000	21,928,000	14,535,544	--	7,392,456	369,631,601
1981	50	26,200,000	4,272,000	21,928,000	14,251,145	--	7,676,855	361,954,716
1982	50	26,200,000	4,272,000	21,928,000	13,955,767	--	7,972,233	353,982,513
1983	50	26,200,000	4,272,000	21,928,000	13,648,983	--	8,279,017	345,703,496
1984	50	26,200,000	4,272,000	21,928,000	13,330,351	--	8,597,649	337,105,847
1985	50	26,200,000	4,272,000	21,928,000	12,999,412	--	8,928,588	328,177,259
1986	50	26,200,000	4,272,000	21,928,000	12,655,690	--	9,272,310	318,904,919
1987	50	26,200,000	4,272,000	21,928,000	12,298,689	--	9,629,311	309,275,638
1988	50	26,200,000	4,272,000	21,928,000	11,927,894	--	10,000,106	299,275,532
1989	50	26,200,000	4,272,000	21,928,000	11,542,769	--	10,385,231	288,890,301
1990	50	26,200,000	4,272,000	21,928,000	11,142,762	--	10,785,238	278,105,063
1991	50	26,200,000	4,272,000	21,928,000	10,721,292	--	11,200,708	266,904,355
1992	50	26,200,000	4,272,000	21,928,000	10,295,762	--	11,632,238	255,272,117
1993	50	26,200,000	4,272,000	21,928,000	9,847,518	--	12,080,452	243,191,665
1994	50	26,200,000	4,272,000	21,928,000	9,382,007	--	12,545,397	230,645,668
1995	50	26,200,000	4,272,000	21,928,000	8,898,456	--	13,029,544	217,616,124
1996	50	26,200,000	4,272,000	21,928,000	8,396,206	--	13,531,794	204,084,330
1997	50	26,200,000	4,272,000	21,928,000	7,874,529	--	14,053,471	190,030,859
1998	50	26,200,000	4,272,000	21,928,000	7,332,670	--	14,595,330	175,435,529
1999	50	26,200,000	4,272,000	21,928,000	6,769,848	--	15,158,152	160,277,377
2000	50	26,200,000	4,272,000	21,928,000	6,185,246	--	15,742,754	144,534,623
2001	50	26,200,000	4,272,000	21,928,000	5,578,021	--	16,349,979	128,184,644
2002	50	26,200,000	4,272,000	21,928,000	4,947,294	--	16,980,706	111,203,938
2003	50	26,200,000	4,272,000	21,928,000	4,192,153	--	17,635,847	93,568,091
2004	50	26,200,000	4,272,000	21,928,000	3,611,649	--	18,316,351	75,251,740
2005	50	26,200,000	4,272,000	21,928,000	2,904,797	--	19,023,203	56,228,537
2006	50	26,200,000	4,272,000	21,928,000	2,170,574	--	19,757,426	36,471,111
2007	50	26,200,000	4,272,000	21,928,000	1,407,918	--	20,520,082	15,951,089
2008	50 <u>2</u>	20,838,751	4,272,000	16,566,751	615,722	--	15,951,029	--

Add: Deferred Interest

to Current Interest

Payments

17,449,681

Deduct: Deferred

Interest From Pay-

ments on Principal

17,348,524

Total - 50 Years 1,253,810,751 212,523,000 1,041,827,711 399,852,91 77 442,000,000

Revenue per year 25,162,150 2,244,000 21,200,000 7,980,000 1,400,000 442,000,000

1 The Seaway is scheduled to commence operating for toll traffic on April 1, 1959. Accordingly, the figures shown on this line are for 9 months only. All expenses, including interest during construction prior to April 1, 1959, are to be capitalized.

2 The gross and net revenues shown for this year are only the amounts sufficient to cover expenses, and to complete the amortization of the debt and the accrued interest thereon.



(iv) Capital Cost

The table shows that the original capital cost was expected to be \$442 million. As we have seen, the cost to date of the Seaway from Montreal to Lake Ontario was only slightly higher than this at \$446 million.

(v) Time Period

The table and the tolls were designed to recapture the total cost (apparently less depreciation) in a fifty-year period.

(B) The Forecasts and the Results

Although the Seaway has been in operation only four years and figures are available at the time of writing for only the first three years, it would be useful to see how the actual figures compare with the forecasts contained in the previous table.

The forecasted figures and the actual figures are set out in the next two tables and show that over the three years 1959 to 1961 actual revenue fell short of that forecasted by \$13 million on the Montreal - Lake Ontario Section of the Seaway, subsequently referred to as the Seaway, and by \$3 million on the Welland Canal.

Despite traffic picking up in 1962, a recent paper clipping reports that the Seaway handled 25.6 million tons in that year compared to the 37 million tons predicted. If this is the case, the cumulative shortfall in revenue will be greater than \$13 million.

This non-forecasted deficiency in revenue was aggravated by the actual expenses being greater than those forecasted. For the same period, this excess was \$0.8 million on the Seaway and \$4.0 million on the Welland. Consequently, the total non-forecasted deficits were \$13.8 million on the Seaway and \$7.0 million on the Welland.



These deficits would have been even greater if the Authority had included a provision in its accounts, as does its United States counterpart, for the depreciation of assets having an estimated lifetime in excess of fifty years. The Auditor General of Canada said in the Authority's Annual Report, 1961: "No provision has been made for the replacement of movable equipment which has an estimated useful life of more than fifty years, or for lock and bridge operating equipment regardless of its life expectancy. Since replacement of worn-out assets is an operating cost, we believe that the financial plans of the Authority should include provision for all such replacements, whether required within or beyond the period of fifty years provided by the Act for the retirement of its indebtedness".

It can be seen on the next table that the Seaway's non-forecasted deficit was 23.64% of actual revenue in 1959, 48.23% in 1960, and 53.99% in 1961.

To have covered the non-forecasted deficits on the Seaway by charging higher tolls during the first three years would have required, even with a zero-elasticity of demand, percentage increases in tolls equal to the percentages in the preceding paragraph.

If the opposite course had been followed, that of reducing tolls, a very great expansion in demand would have been necessary to earn sufficient revenue to cover the non-forecasted deficits. The non-tested belief of the writer is that the demand for the Seaway's facilities would not have expanded nearly enough to have earned sufficient revenue to have covered the deficits.

Which course of action would have been preferable to reduce the size of the deficits depends on the manner in which demand would have behaved in response to toll changes. If it is the wish of the Council to have a more thorough report prepared, this is one matter which should be thoroughly examined.

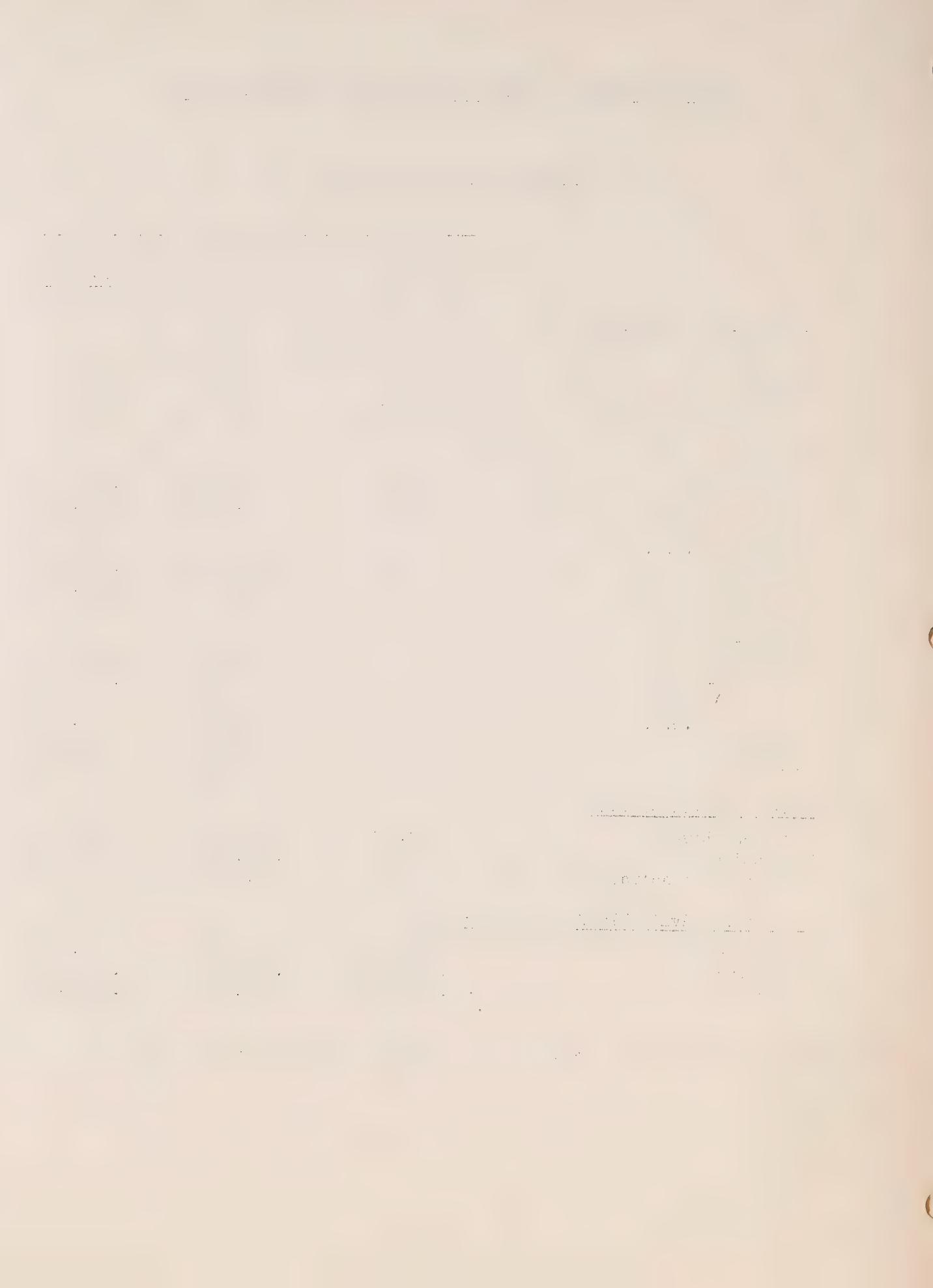


THE FORECASTED AND ACTUAL FIGURES TOGETHER WITH VARIANCES

MONTREAL TO LAKE ONTARIO

	Years		
	1959	1960	1961
(a) <u>Cargo Tons (Millions)</u>			
Forecasted	25	29	33
Actual	21	20	23
Variance	- 4	- 9	-10
Cumulative		-13	-23
(b) <u>Revenue</u>			
Forecasted	13,100,000	15,196,000	17,292,000
-Canada	7,360,057	7,287,848	8,200,000
Actual (1)			
-U.S.A.	3,204,494	3,115,040	3,407,461
Variance	- 2,535,449	- 4,793,112	- 5,684,539
Cumulative		- 7,328,561	-13,013,100
(c) <u>Expenses</u>			
Forecasted	3,200,000	4,272,000	4,272,000
-Canada	1,465,914	2,135,996	2,379,097
Actual (1)			
-U.S.A.	1,695,811	2,360,448	2,475,755
Variance	- 38,275	+ 224,444	+ 582,852
Cumulative		+ 186,169	+ 769,021
(d) <u>Non-forecasted Deficit</u>			
Total as above	2,497,174	5,017,556	6,267,391
Cumulative		7,514,730	13,782,121
Total as % of Actual Revenue	23.64	48.23	53.99
(e) <u>Net Revenue Available for Debt Service</u>			
Forecasted	9,900,000	10,924,000	13,020,000
Total as above	7,402,826	5,906,444	6,752,609
Variance	- 2,497,174	- 5,017,556	- 6,267,391

(1) I have assumed that one Canadian dollar equals one United States dollar.



THE FORECASTED AND ACTUAL FIGURES TOGETHER WITH VARIANCES

WELLAND CANAL

	Years		
	1959	1960	1961
<b>(a) <u>Cargo Tons (Millions)</u></b>			
Forecasted	40.0	43.0	46.0
Actual	27.5	29.2	31.5
Variance	-12.5	-13.8	-14.5
Cumulative		-26.3	-40.8
<b>(b) <u>Revenue</u></b>			
Forecasted	2,810,000	2,965,000	3,119,000
Actual	1,854,417	2,072,794	2,200,000
Variance	- 955,583	- 892,206	- 919,000
Cumulative		- 1,847,789	- 2,766,789
<b>(c) <u>Expenses</u></b>			
Forecasted	1,950,000	2,350,000	2,350,000
Actual	2,487,306	3,865,137	4,551,316
Variance	+ 537,306	+ 1,515,137	+ 2,201,316
Cumulative		+ 2,052,443	+ 4,253,759
<b>(d) <u>Non-forecasted Deficit</u></b>			
Total as above	1,492,889	2,407,343	3,120,316
Cumulative		3,900,232	7,020,548



(C) A Revision of the Revenue Forecast

As the short-term forecasts of the Tolls Committee have not been realized, it is necessary to set out alternative longer-term forecasts in an attempt to ascertain the likely unforeseen deficit over the fifty-year period. In this report only one revised forecast will be made, but it should help us to consider courses of action suited to the new situation.

The actual tonnage shipped through the Seaway in 1959 was 21 million tons. Using this as the base and assuming that tonnage increases 1 million tons per annum (as it did from 1959 to 1961, and as it does in the forecasts of the Committee from 1965 to 1968), we find that the Seaway is not used to capacity until 1988, twenty years after the date originally forecast. This halves the period when the Seaway is expected to be fully utilized at the present toll charges and reduces the possibility that higher tolls after full-capacity is reached will earn sufficient additional revenue to offset the non-forecasted losses of earlier years.

If traffic rises at only one million tons per annum, traffic will be 338 million tons lower than that originally forecasted by the Tolls Committee. In revenue terms, this equals \$177,112,000, ie. 6.76 years revenue at full capacity working. This revenue loss may seem high, but it still excludes the expected increase in costs and also the interest foregone on the revenue deficit itself.

Let us now examine the possible revenue deficit (\$177,112,000) as a percentage of the revised forecasts of revenue over different periods.

(a) Deficit as a percentage of forecasted revenue, 1959-1987. This is the period when the deficit is expected to be made.

$$\frac{177,112,000}{531,860,000} \times 100 = 33.30$$



- (b) Deficit as a percentage of forecasted revenue, 1965-2008. This is the period when it will be possible to adjust the toll charges.

$$\frac{177,112,000}{937,182,751} \times 100 = 18.90$$

- (c) Deficit as a percentage of forecasted revenue, 1988-2008. This is the period when the Seaway is expected to be used to capacity with the present toll charges.

$$\frac{177,112,000}{544,838,751} \times 100 = 32.51$$

If we considered raising tolls to recoup the expected revenue deficit, and assumed that demand or traffic would not contract as a result of those increases, the above percentages show by how much toll charges would have to be raised in each of the periods to recapture the deficit. Traffic, however, is very likely to contract somewhat in response to increases in toll charges, especially during the period of under-full utilization of capacity. This means that even the above suggested increases would not fully recover the expected deficit.

To what extent the increases would help to recover the deficit depends on the degree of contraction which follows in demand or traffic. If a more comprehensive report is prepared, inter alia, it should attempt to gauge the responsiveness of traffic to increased tolls over let us say 1965-2008. The revenue return, however, is likely to be greater if the charges are raised moderately, say every five years, as traffic grows, instead of introducing an early once-and-for-all large increase.

The possibility of recovering the expected revenue deficit by lowering toll charges should also be considered. If tolls are lowered, however, account has to be taken of the additional revenue loss which results from charging the expected traffic, before the reduction, a lower rate.



For example, if toll charges were lowered between 1965 and 1987 by the percentages listed in the following table, the related loss in revenue would have to be added to the deficit of \$177,112,000 expected from the inadequate growth in traffic.

<u>Percentage Reduction in Toll Charges</u>	<u>Related Reduction in Revenue</u>	<u>Total Deficit to be Recovered</u>
5	22,898,800	200,010,800
10	45,797,600	222,909,600
15	68,696,400	245,808,400
20	91,595,200	268,707,200
25	114,494,000	291,606,000

It would be possible to recover the total deficit, by lowering tolls, only during the period 1965 to 1987. The reason for this is that an expansion in traffic is necessary at the lower toll rates to earn sufficient revenue and after 1987 even at the present rates the Seaway is expected to be fully utilized. To recapture the total deficit, then, during the period 1965-1987, demand would have to expand in response to the above reduction in toll charges by the following percentages: 43.7; 48.7; 53.7; 58.7; and 63.7. However, not only is traffic unlikely to expand by such large percentages in response to the stated toll reductions, traffic cannot expand as much as this, for on average over the period unused capacity is only 23.0 percent of potential capacity. Consequently, toll reductions in this period by themselves could not close the total revenue gap.

Much more work is needed on this section, especially on the competitive position of alternative route ways and different modes of transport. Until this is done, one cannot speak with confidence on how tolls should be adjusted. My personal opinion, however, is that if the cost of the Seaway is to be recovered in fifty years, or as much of the cost as possible, reductions in toll charges (as a block) are not desirable.



I think revenue will be maximized if toll charges are raised as actual traffic increases, especially after the Seaway is being used to full-capacity. It has to be recognized, however, that even the wisest changes in tolls may not realize sufficient revenue to ensure full-cost recovery in fifty years.



## (5) FULL-COST RECOVERY AND THE ALTERNATIVES

Considerable sympathy can be felt for the principle of full-cost recovery. It ensures that competitive (assumed to be non-subsidized) facilities are not discriminated against, and in this case that traffic is distributed economically. It also approximates to the normal business principle that an investment should be potentially profitable at the time of its inception.

Even those who are ardent supporters of the above principle may also agree, however, that if the government responsible for an investment believed it to have what I will call non-marketable, net social benefits sufficient to offset forecasted cash losses, that government would be justified in going ahead with that investment and partially financing the outlays from the public purse.

No such provision was made by the Canadian and United States Governments with regard to the St. Lawrence Seaway, as we have seen, for (ignoring Canada's failure to provide for depreciation) tolls were set to cover expenses and to amortize the initial cost plus interest over a fifty-year period.

Although we may agree that full-cost recovery is desirable, it will be more difficult to agree on the length of the pay-back period. Generally, I think it true to say, investors seek a high net <sup>(1)</sup> rate of return from their investment over its lifetime. A short pay-back period is also an important consideration. If the economic life of an asset is very long, a high rate of return may be realized even if the pay-back period is fairly long too. This, I believe, is likely to be the case with the St. Lawrence Seaway, for its facilities are expected to have a much longer life than fifty years.

(1) ie. The expected gross rate discounted for its risk element.



The reason for seeking or hoping to recover the cost of an asset in a specified time arises primarily from the length of the debt obligation which is incurred to finance it. This seems to be the case with the St. Lawrence Seaway, for the bulk of its debt was contracted for just over fifty years. If, however, the economic life of the Seaway is longer than the contractual life of its debt, the Canadian and United States Governments have some justification in paying off the debt obligation in the stipulated time from a combination of tolls and public monies, and recouping itself at a later date from the continuing toll revenue. In other words, there is some justification for extending the amortization period to correspond more with the economic life of the asset than with the contractual life of the debt.

Three possible situations or results confront the Seaway Authorities: -

(A) Full-cost recovery in fifty-years

The implications of this policy were examined in the previous section. It was stated there that whatever changes are made in toll charges it might not be possible to recover the full cost of the Seaway in the stipulated time.

(B) Partial-cost recovery in fifty-years, but full-cost recovery over a longer period

This is the result which is likely to be realized in fact. It would necessitate an extension of the amortization period and this would be equivalent to the Canadian and United States Governments extending ~~loans~~ to their respective Authorities equal to the deficiencies in the net revenue available for debt servicing. Once the initial cost of the Seaway is paid off, further net revenue will become available to reimburse the two governments.

An article on the Seaway in the Financial Post, September 29th, 1962 said: "R.J. Rankin, President of Canada's St. Lawrence Seaway Authority, has suggested no extra burden would be put on the U.S. or Canadian public treasuries if the



amortization period did have to be extended. An extension, however, is a much hotter subject in the U.S., as officials promised when the Seaway legislation was going through Congress that the fifty-year period would not be extended. This promise played a key role in governing votes for the legislation and thus Washington is reluctant to ever think about an extension".

(c) Partial-cost recovery over the lifetime of the Seaway

If the Seaway failed to recover its total costs during its lifetime, the Canadian and United States Governments, whatever their policies, will have to make up the difference. That is, they will be forced to pay for their over optimistic net-revenue projections. It would be wrong to call this subsidization, for essentially it is a capital loss which the investor must bear.

As for subsidization, although it has been reintroduced for the Welland Canal, I cannot see it being accepted as policy for the Montreal-Lake Ontario section of the Seaway. If, however, the likely non-marketable net social benefits were considered substantial, and these deserve study in a more comprehensive report, a case for partial subsidization during periods of under full utilization of capacity would be justified. As the Canadian Manufacturers' Association said in its Submissions to the Tolls Committee: "The ceiling for .... tolls should be that which .... attracts traffic in volume rather than any projected level theoretically calculated to recapture the full cost of providing the facilities".



## (6) TRAFFIC THROUGH THE MONTREAL - LAKE ONTARIO SECTION OF THE SEAWAY

In this section of the report, the volume, composition and direction of traffic will be examined. Among other things, this will show us which industries and to what extent Canadian industries utilize the Seaway.

The simplest approach would be to comment on the tables which are inserted either in or immediately following the text.

Table A - The Growth in Cargo Tonnage

		Cargo Tonnage	
		Actual	Forecasted (Millions)
1955	14' Channel	11,446,620	-
1956	"	13,499,698	-
1957	"	12,191,492	-
1958	"	11,762,100	-
1959	27' Channel	20,593,142	25
1960	"	20,310,346	29
1961	"	23,417,720	33
1962	"	25,593,600	37

It can be seen that a considerable expansion in traffic followed the opening of the new Seaway, but that this expansion was nowhere near so great as that expected by the Tolls Committee.

Table B - Grand Totals

Among other things this table shows that the average cargo tonnage per transit has risen - from 2763 tons in 1959 to 3398 tons in 1961. In addition it can be seen that bulk cargo accounts for 83 to 85 per cent of cargo tonnage, and that between 1959 and 1961 downbound traffic (West to East) rose from 47 to 65 per cent of total traffic.



TABLE B - GRAND TOTALS

	Years		
	1959	1960	1961
No. of Transits	7,452	6,869	6,892
Net Tons	16,249,082	16,158,261	18,931,388
Gross Tons	25,085,995	25,131,250	28,908,578
Cargo Tons	20,593,142	20,310,346	23,417,720
" Downbound	46.8%	56.8%	64.8%
" Upbound	53.2%	43.2%	35.2%
" Bulk	85.0%	83.0%	84.1%
" General	5.8%	5.5%	3.7%
" Mixed	9.2%	11.5%	12.2%
Passengers	7,849	8,514	9,088
Toll Revenue	10,046,877	10,109,059	11,407,060
" Bulk	73.8%	70.2%	72.9%
" General	11.2%	11.0%	7.5%
" Mixed	12.2%	16.1%	16.7%

Table C - The Main Commodities in Total Traffic

Approximately 75% of the total cargo tonnage consists of raw materials and agricultural products. Two commodities, wheat and iron ore, account for as much as 44% of total traffic. Wheat shipments rose considerably in 1961 from 1% to 28% of total traffic, but they have been reported lower for 1962, both in absolute and relative terms. Iron ore shipments, too, reflecting the state of the United States steel industry, have also fluctuated. They fell nearly two million tons in 1960 from 30% to 21% of total tonnage, but made a substantial recovery in 1962.



TABLE C

MAIN COMMODITIES AS PERCENTAGES OF TOTAL CARGO TONNAGE

<u>Commodities</u>	<u>1959</u>	<u>1960</u>	<u>1961</u>
Wheat	16.6	19.0	27.8
Corn	4.6	5.4	6.8
Barley	5.6	5.8	3.0
Soybeans	1.1	2.8	2.3
- Total Agricultural Products	36.3	40.5	45.6
- Total Animal Products	0.6	1.1	1.2
Bituminous Coal	5.8	5.0	4.9
Iron Ore	30.4	21.2	17.2
- Total Mine Products	39.9	31.9	26.0
- Total Forest Products	1.4	1.4	0.9
Fuel Oil	5.5	5.8	4.7
Iron and Steel Manufactured	0.7	3.5	2.2
Newspaper	1.4	1.3	1.2
Scrap Iron and Steel (1)	0.3	2.8	5.7
- Total Manufactures (1)	19.2	22.4	23.7
- Total Package Freight	2.5	2.7	2.6

CARGO TONNAGE OF MAIN COMMODITIES

<u>Commodities</u>	<u>1959</u>	<u>1960</u>	<u>1961</u>
Wheat	3,367,375	3,853,923	6,521,068 (2)
Iron Ore	6,187,010	4,315,432	4,017,254
Bituminous Coal	1,188,766	1,020,467	1,155,528
Fuel Oil	1,136,139	1,177,697	1,103,652

(1) 1959 figures include unclassified cargoes.

(2) The 1962 tonnage is reported to be 6,014,788 tons.



Table D - Main Commodities in Upbound Traffic

Mine products on average account for about 63% of total traffic or cargo tonnage moving westward through the Seaway. Iron ore is the most important commodity. It accounted for 57% of total traffic in 1959. Another 30% of traffic is included under manufacturing. The contribution of agriculture is consequently negligible.

Table E - Main Commodities in Downbound Traffic

As we would expect, agricultural products account for the major portion of the traffic shipped eastward. This portion was as high as 78% in 1959, but it has since fallen 8 points despite increased wheat shipments. The tonnage recorded under manufactures has also increased, but much of this was iron and steel scrap.



TABLE D

MAIN COMMODITIES AS PERCENTAGE OF UPBOUND TRAFFIC

<u>Commodities</u>	<u>1959</u>	<u>1960</u>	<u>1961</u>
- Total Agricultural Products	0.1	0.4	1.1
- Total Animal Products	0.2	0.2	0.4
Bituminous Coal	4.3	3.6	6.8
Iron Ore	56.9	49.1	46.2
Petroleum Crude	2.7	4.5	1.4
- Total Mine Products	66.7	62.7	58.8
Pulpwood	2.6	2.9	2.1
- Total Forest Products	2.6	3.1	2.4
Fuel Oil	10.2	13.0	12.5
Iron and Steel Manufactured	1.1	2.5	3.8
Newspaper	2.5	3.0	3.4
Sugar	1.1	0.6	1.6
- Total Manufactures	28.3	31.3	34.7
- Total Package Freight	2.0	2.3	2.6

TABLE E

MAIN COMMODITIES AS PERCENTAGE OF DOWNBOUND TRAFFIC

<u>Commodities</u>	<u>1959</u>	<u>1960</u>	<u>1961</u>
Wheat	35.5	33.5	43.0
Corn	9.8	9.5	10.5
Oats	7.7	4.3	1.8
Barley	12.1	10.2	4.2
Soybeans	2.3	4.9	3.5
Flaxseed	3.5	2.7	1.8
- Total Agricultural Products	77.6	71.0	69.7
- Total Animal Products	1.1	1.8	1.6
Bituminous Coal	7.6	6.0	3.9
- Total Mining Products	9.5	8.4	8.2
- Total Forest Products	0.1	0.1	0.1
Iron and Steel Manufactured	0.3	4.3	1.2
Scrap Iron and Steel	0.5	4.9	8.9
- Total Manufactures	8.6	15.6	17.8
- Total Package Freight	3.0	3.1	2.6



Table F - Traffic by Origin and Destination of Cargo

(i) Upbound Traffic

Although 79% of this traffic originates in Canada, only 38% is destined for Canada. As little as 0.7% originates in the United States while it receives 62% of the traffic. This situation results primarily from the large shipments of iron ore from Quebec and Labrador to the United States.

(ii) Downbound Traffic

About 52% of this traffic originates in Canada, 48% of course in the United States. Over 60% of the traffic is destined for Canadian ports, only 0.4% for U.S. ports. The remainder is destined for direct shipment abroad. Much of that which is destined for Canadian ports, however, is subsequently transhipped abroad. This is especially the case with grain.

Table G - Traffic by Country of Ship's Registry

A surprisingly large proportion of the ships plying the Seaway are Canadian registered. The United Kingdom is the only other country accounting for 10% or more.

TRAFFIC BY COUNTRY OF SHIP'S REGISTRY

<u>Countries</u>	<u>Percentages of Cargo Tonnage</u>		
	<u>1959</u>	<u>1960</u>	<u>1961</u>
Canada	65.2	54.4	60.3
U.K.	9.1	12.2	10.0
Norway	N.A.	7.3	5.3
Germany	4.2	5.4	4.5
British Commonwealth	0.3	1.5	3.5
Liberia	N.A.	5.1	3.1
Greece	0.6	3.2	2.3
U.S.A.	3.2	2.8	2.2
Others	N.A.	8.1	8.8



TABLE F

## TRAFFIC BY ORIGIN AND DESTINATION OF CARGO

Origin and Destination (1)

	Up			Down		
	1959	1960	1961	1959	1960	1961
Canada to Canada %	3,142,739 (28.9)	2,084,432 (23.7)	2,389,548 (29.0)	4,131,127 (43.5)	4,399,353 (38.1)	6,652,784 (43.8)
Canada to United States %	5,751,849 (52.9)	4,570,012 (52.0)	4,080,421 (49.6)	9,426 (0.1)	6,676 (0.1)	-
Canada to Foreign %	-	-	-	823,424 (8.7)	1,387,115 (12.0)	1,244,835 (8.2)
Foreign to Canada %	841,671 (7.7)	1,174,075 (13.4)	717,189 (8.7)	-	-	-
United States to United States %	19,616 (0.2)	2,216 (-)	35,223 (0.4)	24,610 (0.3)	45,169 (0.4)	72,110 (0.5)
United States to Canada %	59,416 (0.6)	48,977 (0.6)	20,865 (0.3)	1,735,791 (18.3)	1,773,061 (15.4)	2,736,651 (18.0)
United States to Foreign %	-	-	-	2,759,392 (29.1)	3,917,351 (34.0)	4,476,849 (29.5)
Foreign to United States %	1,052,650 (9.7)	901,909 (10.3)	991,245 (12.0)	-	-	-
	10,867,941	8,781,621	8,234,491	9,483,770	11,528,725	15,183,229
	=====	=====	=====	=====	=====	=====

(1) Origin and Destination means country in which traffic was loaded or unloaded for Seaway transit.



(7) EVALUATION

What conclusions can we draw from this report?

The section dealing with the flow of traffic through the St. Lawrence Seaway showed that the Seaway is highly dependent on two commodity groups - the first being agricultural products, especially wheat, and the second being mined products, especially iron-ore, together accounting for about three-quarters of the total traffic. The commodities within these two groups originate, for the most part, in Canada, but are destined mainly for markets outside this country. Ontario does not account for a large proportion of the above commodities and an examination of the commodity flows suggests that Ontario is responsible for less than 15% of the traffic passing through the Seaway.

With regard to the projections of the Tolls Committee, when these were compared with the actual figures for the period 1959-1961 it was revealed that the actual net revenue available for servicing the debt was very much below that forecasted. Using the actual figures, my revised forecast of revenue showed that the Seaway, with its present toll charges, would be incapable of recovering its total cost in 50 years. It was then indicated that if the Canadian and United States Governments continued with their policy of recovering the full cost of the Seaway in 50 years, it would be necessary to alter the toll charges. The opinion stated was that revenue would be maximized if tolls were increased periodically over time as demand expanded, especially once the Seaway was being used to capacity.

Although this policy might maximize revenue, the conclusion was reached that if demand conditions were not favourable, even the wisest manipulation of toll rates would not expand revenue sufficiently to ensure full cost recovery in 50 years, especially as it seems that the Seaway's costs will be higher than those predicted by the Tolls Committee.



I then examined the courses of action open to the two Governments if it appeared that the Seaway would be incapable of recovering its total costs in the 50-year period. Firstly, it was suggested that the pay-back period should be extended, to be more in conformity with the economic life of the Seaway rather than the contractual life of its debt. Secondly, if it appeared that the Seaway would not be able to recoup its total costs even over its economic life, or if it could be demonstrated that net non-marketable benefits stemmed from the existence of the Seaway, partial subsidization would be justified.

The Ontario Economic Council may now wish to have a more comprehensive report prepared as a basis for the presentation of a submission to the Federal Government. If it does, that report should give careful consideration to the following matters:

- (a) The competitive position (cost advantage) of the Seaway relative to
  - (i) other route ways such as Detroit - New York and Seven Islands - Baltimore - Pittsburgh, and (ii) other methods of transportation, especially rail.
- (b) A more thorough breakdown of traffic flows, inter alia, to discover the importance of the Seaway to Ontario.
- (c) An up-dating of the financial analysis contained in this report and preparation of alternative projections of revenue and costs.
- (d) An examination of the desirability and possible effects of toll changes and subsidization.









